

## Frequency Tripling of Beam Noise\*

J.M. Auerbach, C. Barker, P.J. Wegner and D. Eimerl

Lawrence Livermore National Laboratory  
P.O. Box 808, L-490  
Livermore, CA 94550 USA

(510) 422-5328/FAX (510) 423-6506

[Abstract submitted to 2nd Annual International Conference on Solid-State Lasers  
for Application to Inertial Confinement Fusion (ICF), Paris, France (1996)]

### Abstract

The characteristics of the  $3\omega$  focal spot are determined by the properties of the  $1\omega$  beam and the frequency tripling process. The size of the  $3\omega$  focal spot depends on the spectrum of spatial noise in the  $1\omega$  beam. A perturbation theory for ripple transfer in frequency tripling is used to predict the characteristics of the  $3\omega$  focal spot. The theory predicts that  $1\omega$  phase noise grows 9X in power in the tripling process. This can cause a significant reduction in  $3\omega$  energy delivered to the target. Results from Beamlet  $3\omega$  focal spot characterization experiments are also presented.

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\*Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under contract number W-7405-ENG-48.